

WHAT IS CLAIMED IS:

1. A phase-change optical recording medium capable of carrying out record/ readout/ erase operations of information data through reversible phase transition between amorphous and crystalline states
5 induced by light beam irradiation in a recording layer included in said recording medium, comprising:

a transparent substrate on which the light beam is incident; and
contiguous layers formed on said substrate in order as follows, a
lower dielectric protective layer, said recording layer, an upper dielectric
10 protective layer, and a reflective/ heat dissipating layer; wherein

said upper dielectric protective layer essentially consists of a mixture of ZrO_2 and SiO_2 , having a composition of $(\text{ZrO}_2)_{100-x} (\text{SiO}_2)_x$, where $0 < x < 60$ (mole %).

15 2. The phase-change optical recording medium according to claim 1,

wherein said upper dielectric protective layer has a thermal conductivity of at most 2W/ mK .

20 3. The phase-change optical recording medium according to claim 1,

wherein said reflective/ heat dissipating layer essentially consists of a material selected from the group consisting of Ag and Ag alloys.

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4. The phase-change optical recording medium according to claim 1,

wherein said recording layer essentially consists of Sb and Te, as major ingredients, further consisting of at least three kinds of elements selected from a group consisting of Ag, In, Ge and Ga, having a composition of $X_\alpha \text{Sb}_\beta \text{Te}_{100-\alpha-\beta}$, with X being at least three kinds of elements above mentioned, where $0 < \alpha < 15$, and $65 < \beta < 80$ (atom %).

5. The phase-change optical recording medium according to claim 1,

wherein said recording medium is operable at a linear velocity of 7 m/sec or more during recording.

6. A phase-change optical recording medium capable of carrying out record/ readout/ erase operations of information data through reversible phase transition between amorphous and crystalline states induced by light beam irradiation in a recording layer included in said recording medium, comprising:

a transparent substrate on which the light beam is incident; and contiguous layers formed on said substrate in order as follows, a lower dielectric protective layer, said recording layer, a first upper dielectric protective layer, a second upper dielectric protective layer, and a reflective/ heat dissipating layer; wherein

said first upper dielectric protective layer essentially consisting of a mixture of ZnS, ZrO_2 and SiO_2 , having a composition of $(\text{ZnS})_x (\text{ZrO}_2)_y (\text{SiO}_2)_{100-x-y}$, where $30 < x < 70$ and $30 < y < 70$ (mole %).

7. The phase-change optical recording medium according to claim 6,

wherein said second upper dielectric protective layer essentially consists of SiC.

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8. The phase-change optical recording medium according to claim 6,

wherein said first upper dielectric protective layer has a thermal conductivity of at most 2W/ mK.

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9. The phase-change optical recording medium according to claim 6,

wherein said recording layer essentially consists of Sb and Te, as major ingredients, further consisting of at least two kinds of elements selected from a group consisting of Ag, In and Ge, having a composition of $X_{\alpha} Sb_{\beta} Te_{100-\alpha-\beta}$, with X being at least two kinds of elements above mentioned, where $0 < \alpha < 15$, and $60 < \beta < 80$ (atom %).

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10. The phase-change optical recording medium according to claim 6,

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wherein said reflective/ heat dissipating layer essentially consists of a material selected from the group consisting of Ag and Ag alloys.

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11. The phase-change optical recording medium according to claim 6,

wherein said recording medium is operable at a linear velocity

of 7 m/ sec or more during recording.

12. A phase-change optical recording medium, comprising:
a reflective/ heat dissipating layer provided contiguously to at
5 least one surface of a recording layer, having a dielectric protective
layer interposed between said reflective/ heat dissipating layer and said
recording layer;

wherein said recording layer essentially consists of a phase-change
recording material having a Sb_3Te meta-stable phase, said dielectric
10 protective layer essentially consists of a dielectric material containing
 ZrO_2 as a major ingredient, and said reflective/ heat dissipating layer
essentially consists of Ag, as a major ingredient.

13. The phase-change optical recording medium according to
15 claim 12,

wherein said dielectric material, which contains ZrO_2 as a major
ingredient, is stabilized zirconia.

14. The phase-change optical recording medium according to
20 claim 12,

wherein said dielectric material containing ZrO_2 as a major
ingredient is selected from the group consisting of:

- (i) $(\text{ZrO}_2)_{100-x} (\text{CrO}_2)_x$, where $0 \leq x \leq 50$ (mole %),
- (ii) $(\text{ZrO}_2)_{100-x} (\text{Nb}_2\text{O}_5)_x$, where $0 \leq x \leq 30$ (mole %),
- 25 (iii) $(\text{ZrO}_2)_{100-x} (\text{REO})_x$, where RE designates rare earth, and
where $0 \leq x \leq 20$ (mole %),
- (iv) $(\text{ZrO}_2)_{100-x} (\text{MgO})_x$, where $0 \leq x \leq 20$ (mole %),

- (v) $(\text{ZrO}_2)_{100-x}(\text{CaO})_x$, where $0 \leq x \leq 20$ (mole %),
(vi) $(\text{ZrO}_2)_{100-x}(\text{Y}_2\text{O}_3)_x$, where $0 \leq x \leq 20$ (mole %), and
(vii) $(\text{ZrO}_2)_{100-x}(\text{TiO}_2)_x$, where $0 \leq x \leq 20$ (mole %).

5 15. The phase-change optical recording medium according to
claim 12,

 wherein said reflective/ heat dissipating layer essentially
consists of Ag-Cu alloys having a compositional ratio of $0.1 \leq \text{Cu/Ag} \leq$
10 (mole ratio).

10 16. The phase-change optical recording medium according to
claim 12,

 wherein said recording layer is interposed between said
dielectric protective layers each essentially consisting of said dielectric
15 material, which contains ZrO_2 as a major ingredient, of anyone of claims
II-3 and II-4.

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